Modelling Roles

COMP62342
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Occupations

- Imagine we have some information about people and their occupations (and where that information is derived from)
- How might we define an ontology to allow us to describe this data?
- What are the classes we need to represent?
- What are the properties or relationships that we need to describe?
- How can we map from spreadsheet data into some populated ontology?
- What queries can we then ask?
- Name of Person
  - Given Name
  - Surname
  - Possibly Married name
- Date of Birth
  - If known
- Occupation
  - Year
  - Source
  - (Additional Notes)
- Sex?
Modelling in OWL

• Recall that OWL allows us to describe
  – Individuals.
  – Classes (of Individuals).
  – Relationships between Individuals or Properties of Individuals.

• What are our Individuals here?
• What are the Classes
• What are the Properties/Relations?
Basic Data

• Each Person has
  – Given Name
  – Surname
  – Date of Birth

• Some Persons (Women) may also have
  – Married Surname

• OWL provides Datatype properties that allow us to associate data values with Individuals.
  – Strings, numbers etc.
Occupations

• We are assuming that we have a hierarchy of occupations or roles (not all of the things that people are listed as doing are necessarily occupations)
• This is a simple taxonomy.
• We might, at some point, be concerned about modelling this more completely, e.g. through descriptions of the roles, but for current purposes, an asserted hierarchy is fine.

• However, a key question is how we associate people with the occupations/roles that they are playing.
Modelling Occupations: Attempt #1

Class: Person
Class: Role
SubClassOf: Role

Individual: W.G.Bright
Types: Person, Butcher
Modelling Occupations: Attempt #2

- **Class**: Person
- **Class**: Role
- **Class**: Butcher
- **SubClassOf**: Role

**ObjectProperty**: hasRole

- **Individual**: Butcher-1
  - **Types**: Butcher
  - **Facts**: hasRole Butcher-1
- **Individual**: W.G.Bright
  - **Types**: Person
Named and Anonymous Individuals

• OWL allows us to make statements about particular named individuals.
• Fred has a cat called Tibbs.

| Individual: Fred |
| Types: Person |
| Facts: hasPet Tibbs |

| Individual: Tibbs |
| Types: Cat |

• We can also refer to *anonymous* individuals
• Fred has a cat, but we don’t know anything about it
• This representation of *incomplete* information can be useful when we don’t know (or don’t care) about the particular individual.

| Individual: Fred |
| Types: Person that hasPet some Cat |
Modelling Occupations: Attempt #3

Class: Person
Class: Role
Class: Butcher
SubClassOf: Role

ObjectProperty: hasRole

Individual: W.G.Bright
Types: Person that hasRole some Butcher
Modelling Occupations: Attempt #4

Class: Person
Class: Role
SubClassOf: Role
Class: RolePlayed

ObjectProperty: playsRole
ObjectProperty: hasRole

Individual: W.G.Bright
Types: Person that playsRole some (RolePlayed that hasRole some Butcher)
Modelling Sex: Male and Female

• People are Male or Female
  – For the purposes of this model we will take a simplified view and not consider transgender/androgeny etc.
  – Thus every person is either Male or Female and not both

A. Subclasses of Person Male, Female, with Individuals being asserted as instances of those classes
  • Disjointness and Covering Axioms

B. Two distinct Individuals Male, Female with a functional ObjectProperty hasSex

C. Classes Male, Female, a functional ObjectProperty hasSex with Individuals being asserted to be related to anonymous Individuals of those classes.
  • Disjointness and Covering Axioms
Modelling Male and Female

- Incomplete information?
- Extensibility?
- Shared “maleness”?
- Definitions of Man and Woman?
- How can we tell if people are Male or Female in the data?
Modelling Dates

• The data states a date for the occupation
  – Start date?
  – End date?
  – Some kind of duration?

• A simple approach here is to provide a DatatypeProperty that associates the year (as an integer) with the RolePlayed instance
  – An advantage of considering the RolePlayed as an object.
  – Other data types are available. e.g. for dates

• Limitations?
Provenance

• It is often important to maintain the *provenance* of information.
  – Where does this fact come from?
• The data includes this for most of the facts
  – Census Records
  – Birth Records
  – Death Records
  – Marriage Records
• We can provide additional attributes on the RolePlayed Individuals stating where the information came from

• As with Sex there are possible choices
  – Distinct Individuals: Census, BirthRecord, DeathRecord etc.
  – Classes for Source types
  – Classes for Source types with Anonymous Individuals.
  – Would we ever want to name these?
Named or Anonymous RolePlayed Object?

Individual: William_George_Bright_1901
Types: playsRole some (RolePlayed
    and hasRole some Butcher
    and hasYear value "1929"^^integer
    and hasSource some MarriageRecord)

Individual: James_Bright_1809
Facts: playsRole rolePlayed_001

Individual: rolePlayed_001
Types: RolePlayed and (hasRole some Seaman)
Facts: hasYear "1839"^^integer